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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/721,841

11/25/2003

Solomon Assefa

MIT10307

6945

7590

09/14/2006

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EXAMINER

NGUYEN, DUNG T

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 09/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/721,841

Applicant(s)

ASSEFA ET AL.

Examiner

Dung (Michael) T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8, 10-24, 26-36, 38-56 and 58-72 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 14-24, 26, 30-36, 38, 42-44, 53-56, 58 and 62-64 is/are rejected.
- 7) ☒ Claim(s) 11-13, 27-29, 39-41, 45-52, 59-61 and 65-72 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-8, 10, 16-24, 26, 32-36, 38, 42, 53-56, 58, and 62 are rejected under 35

U.S.C. 102(b) as being anticipated by Johnson et al. (6198860).

With respect to claims 1, 8, 17, 24, 33-36, 53-54, and 56, Fig.12B shows a microcavity structure comprising: a first waveguide 1200 including a first photonic crystal microcavity (col.1, 1.62); and a second waveguide 1202 including a second photonic crystal microcavity (col.1, 1.62); and a microcavity active region (resonant structure) (col.2, 1.33-40) that is created by overlapping said first and second microcavities; wherein said first waveguide and second waveguide comprise means for electrical activation ( see claim 39).

With respect to claims 2 and 18, Fig.12B shows said microcavity overlap is defined by crossing of at least two of the said microcavity waveguide at an angle (waveguides 1200 and 1202 are overlapped by 90 degrees).

With respect to claims 3-5, 6-7, 19-23, 35, and 55, Col.7, 1.21-23 and Fig.12B discloses the variation in material refractive index of the holes 1204 in the waveguides (as disclosed in the specification of this application, the variation in material refractive index of the holes will act as

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optical reflectors), where the claimed and prior art structures are the same, claimed properties (the microcavities being reflective) may be presumed inherent.

With respect to claims 16, 32, 42, and 62, Fig.12B shows at least one of said waveguides is used to guide light. They are disclosed as waveguides, therefore by definition they guide light.

With respect to claims 10, 26, 38, and 58, it is inherent that at least a contact is coupled to each of the waveguides in order to have the current conduction.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14-15, 30-31, 43-44, and 63-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (6198860) in view of Scherer et al. (6711200). Johnson disclose all limitations of the claims except for the quantum dot active material.

Scherer teach the quantum dot active material (col.4, l.27-31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Johnson what is taught by Scherer to provide an ideal material for fabricating active structures with high surface to volume ratios such as photonic laser microcavities (col.4, l.28-31).

*Response to Arguments*

Applicant's arguments filed on 07/24/06 have been fully considered but they are not persuasive.

- On page 13, last paragraph, the applicants argued that Johnson et al.'860 did not mention the first waveguide and second waveguide are photonic crystals. The examiner does not concur because indeed Johnson et al.'860 did teach the first waveguide and second waveguide are photonic crystals (col.1, l.60-61).
- On page 14, lines 1-2, the applicants argued that the intersection of the first and second waveguides of Johnson et al.'860 to form a passive region. The examiner disagrees because Johnson et al.'860 never mention that the intersection of the first and second waveguides of Johnson et al.'860 to form a passive region, anywhere.
- On page 14, lines 3-5, the applicants argued that Johnson et al.'860 did not anticipate the microcavity active region is formed by overlapping the microcavity waveguides. The argument is not persuasive because Fig.12B of Johnson et al. did show the microcavity active region (photonic crystal resonator) is formed by overlapping the microcavity waveguides and also it is understood that one skilled in the art would know that a photonic crystal structure is used to fabricate a microcavity as evidenced by Joannopoulos et al. (6058127).

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**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

***Allowable Subject Matter***

Claims 11-13, 27-29, 39-41, 45-52, 59-61, and 65-72 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Communication Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung (Michael) T Nguyen whose telephone number is (571) 272-1949. The examiner can normally be reached on 8:30 - 17:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Min Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-3329.

Michael Dung Nguyen

  
MINSUN OH HARVEY  
PRIMARY EXAMINER